



# Intermittency Analysis Project: 2010 Accelerated and 2020 Scenarios

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Dora Yen-Nakafuji,  
Commission Project Manager

Kevin Porter,  
IAP Team Lead

CEC PIER Staff Workshop  
February 13, 2007  
Sacramento, CA





# Agenda

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- 9:00-9:15 am Welcome & Introductions – *Yen/Porter*
- 9:15-9:45 am Transmission Planning: CaISO Perspective – *Gary DeShazo*
- 9:45-10:15 am Wind Turbine Technologies – *BEW Engineering*
- 10:15-12:00 Transmission Simulation – *DPC Team*
- 12:00-1:15 pm Lunch
- 1:30-4:30 pm Projected 2010 Accelerated and 2020 Impacts – *GE Team*
- 4:30-5:15 pm Discussions, Q&A – *All*
- 5:15-5:30 pm Next Steps & Feedback – *Yen/Porter*



# IAP Objectives



- Focus on statewide transmission planning options to meet policy
- Focus on providing quantitative impacts (pros & cons) of various options on transmission reliability, congestions and mix of renewable technologies
- Develop tools and analysis methods to evaluate renewables along with conventional generation
- Provide a common perspective for evaluating different technologies competing for limited system resources
- Provide a common forum for Commissions, utilities and developers to examine the location and timing of new generation/transmission projects and public benefits of these resources



# IAP Scenarios

	2006	2010T	2010X	2020
<b>Peak California Load, MW</b>	<b>58,900</b>	<b>62,600</b>	<b>62,600</b>	<b>74,300</b>
<b>Peak CalSO Load, MW</b>	<b>48,900</b>	<b>51,900</b>	<b>51,900</b>	<b>61,200</b>
<b>Total Geothermal, MW</b>	<b>2,400</b>	<b>4,100</b>	<b>3,700</b>	<b>5,100</b>
<b>Total Biomass, MW</b>	<b>760</b>	<b>1,200</b>	<b>1,000</b>	<b>2,000</b>
<b>Total Solar, MW</b>	<b>330</b>	<b>1,900</b>	<b>2,600</b>	<b>6,000</b>
<b>Total Wind, MW</b>	<b>2,100</b>	<b>7,500</b>	<b>12,500</b>	<b>12,700</b>

# Project Core Analysis Team

Analysis Team	Company	Activity
<b>Kevin Porter</b>	Exeter Associates	Team Lead; World-wide Experience
<b>Bill Erdman; Kevin Jackson</b>	BEW Engineering; Dynamic Designs	Wind Turbine Technology
<b>DPC Team</b>	Davis Power Consultants; PowerWorld Corporation; Anthony Engineering	Transmission Planning, Power Flow Analysis
<b>GE Team</b>	GE Energy; AWS Truewind; Rumla Inc.	Production Cost Analysis, Statistical Analysis, Wind Forecast and Data
<b>Henry Shiu, Case van Dam, Michael Milligan, Brendan Kirby</b>	California Wind Energy Collaborative (UC Davis); NREL; Oak Ridge National Lab	Data Support, Technology Characteristics, Integration Costs



# Acknowledgments

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- Utilities
- CPUC
- Renewable energy companies and trade associations
- Tehachapi and Imperial Study Groups
- CA ISO



# Status of IAP Project

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- Impact of Past, Present & Future Wind Technologies on Transmission & Operation Report - completed and posted on Commission website
- Workshop today - present preliminary results of 2010 Accelerated Case and 2020 Case
- Report on Lessons Learned from Europe and Asia in review
- Final reports on project in preparation



# IAP Report Schedule

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- Draft GE and DPC reports in early March for internal review
- Final reports will be made available on Commission website

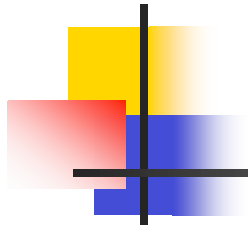




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# February 13<sup>th</sup> IAP Workshop Closing Slides



# Follow-on Efforts

- Continue supporting CaISO's Strategic Transmission Planning (beyond 10yr perspective)
  - Help prioritize transmission investments for sustaining growth and integration of renewables
  - Refine wind integration analysis methodologies and forecasting capabilities
- Kick-off of Northern California Renewable Integration Effort
  - Leverages IAP findings and focuses on sub-regional issues
  - Focus on local requirements, generation mix specific to sub-region, transmission needs & operational flexibility, service area
  - Scenario based approach fostering collaboration among utility stakeholders
- Support WECC's wind turbine code validation effort
  - Coordinated with PIER TRP effort
  - Link CA resources to grid code development
- Investigate closer coupling of renewables and hydro-resources



# Thank you

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- Please provide questions & comments by February 28th, 2007
  - Send to Peter Spaulding [pspauldi@energy.state.ca.us](mailto:pspauldi@energy.state.ca.us) and include "IAP Comments Feb 13" in header
- All workshop materials will be posted on Commission website
- For more information:
  - Commission contact: Dora Yen-Nakafuji  
[dyen@energy.state.ca.us](mailto:dyen@energy.state.ca.us)
  - Project lead: Kevin Porter  
[porter@exeterassociates.com](mailto:porter@exeterassociates.com)